INTERNATIONAL HEALTH EXHIBITION

Supplements to The Builder.

No. 5. JUNE 14, 1884.

AMBULANCE.—GROUP IIIA.

BY A SURGEON.

AMONG the most pertinent and original exhibits at the Health Exhibition at South Kensington are the aids to the sick and wounded in war and in peace, which are grouped at one end of the Queen's Gate Annexe, adjoining "Belgium." A very few years ago ambulance for popular use was unknown, and it is to the benevolent employment of civil aids in the Franco-German and subsequent wars that we owe the adoption of the contrivances for succouring the wounded in war to rescuing the sick and injured following peaceful occupations. In the catalogue a distinction is drawn between the aids for the sick and wounded in war and those for the sick and injured in peace, but the difference is one rather of degree than of kind, as, the conditions of their employment being similar, the apparatus are necessarily of similar construction. Completely equipped ambulances for use in war are exhibited by the British and Belgian Army Medical Departments, and deserve examination for the practical and serviceable character of the appliances and the ingenuity of their disposal. For civil purposes such ambulances are not needed, as stores of surgical instruments and drugs are to be found in every hospital and private surgery, but they are suggestive of the great extent of such requirements and the newest and most economic forms they assume. Indeed, in mining districts and where large excavations are going on, as in the construction of docks and railways, the complete army ambulance might well take the place of the temporary and often incompletely equipped local surgery.

The aids for the sick and injured in peace are well seen on the Stand (1,064) of the St. John's Ambulance Association, and the adjoining one (1,063) occupied by the carriages exhibited by Mr. John Furley, who conjointly have been the pioneers of the movement. The means of removing the sick and injured from the scene of accident or from the home to the hospital, are necessarily limited, and the variations observed in the numerous exhibits are intended to meet unusual and accidental conditions of position, space, &c. For removing the patient in the recumbent position there are numerous stretchers which may be carried by hand, on two or more wheels, or in spring vans; and for removing them in the sitting position there are chairs with handles, innumerable modifications of the Bath chair, and of ordinary vans and carriages. Of the common stretcher, examples are found in the stalls of the Army Ambulance (1,045) and the St. John's Ambulance Association (1,064 and 1,056), some of the latter modified for use in mines, sewers, and confined spaces. Thus the handles of one are made telescopic, and another is fitted with a jacket to secure the patient to the stretcher in order that he may be removed in the upright position. The strong folding police stretcher, which runs on a pair of wheels with springs, like a hand barrow, and furnished with a cover, appears to us the most generally useful of all these appliances for civil purposes, where the roads are tolerably good and the distance to be traversed is not great. The room required for housing this and other stretchers is considerable, and when this is a consideration the Ashantee pocket hammocks, exhibited by Seydel & Co. (1,062), might be used as a substitute. Indeed, we are surprised that the lightness, cheapness, and portableness of these hammocks has not recommended their use to the police and ambulance associations. The weight of one of them is about 2 lb., and it can be carried in the coat-pocket, and its cost is only a few shillings. For carrying invalids in the sitting position there are several chairs, with handles in front and behind, one of the most convenient and economical of which is exhibited by J. Ward (1,034) as a "carrying chair, made portable for travelling." When folded up it occupies little more space than an ordinary camp-stool, and we think it should not only form a part of the impedimenta of the travelling invalid, but also an item of the furniture of every household. Other chairs of a similar, but more expensive and luxurious form, are exhibited by Carter (1,029), McIlroy (1,030), and other firms.

Of invalid chairs, couches, and beds (one of which, exhibited by Leveson & Sons (1,027), is priced at fifty guineas and called an invalid ambulance), there is a most ample supply,—enough, we think, to meet every whim of the valetudinarian, and even suggest new ones to his already too fertile brain. These vehicles are forms of house furniture, and hardly come within the meaning of ambulance appliances, and we therefore pass them over in this article. We were glad to learn from one of the exhibitors that that once very familiar piece of furniture, the spinal couch, has fallen much in price lately because there is little demand for it. It is satisfactory to learn on such good authority that improved medical knowledge and more rational physical occupations of girls are so rapidly abolishing that great *opprobrium medicinæ*, the so-called spinal complaint.

Examples of ambulance-vans, omnibuses, and carriages are exhibited by Mr. Furley (1,063), the Metropolitan Asylums Board (1,047), and J. Offord (1,041), all of which are adapted for the removal of either sick or surgical cases. The van exhibited by the Asylums Board being intended specially for the removal of infectious cases, is well coated with varnish inside, but otherwise contains no special arrangement for being disinfected. The whole of these vehicles, not excepting Mr. Furley's village ambulance-carriage, appear to us to be unnecessarily elaborate and expensively got up, and we are at a loss to know why a light van, constructed on the lines of the army ambulance-wagon, has not been adopted. The great expense of providing such carriages must necessarily limit and often preclude their use altogether; and when it is borne in mind that their chief use is for the conveyance of the poorer classes, the refinements of the coachbuilder's art might well be dispensed with. It is the natural tendency of exhibitions of the kind now being held at South Kensington to favour the production of showy things rather than really useful ones; but the serious work to which ambulance is devoted, and the yet uncertain position which the movement has attained in popular favour, ought to have prevented the exhibitors in this section from falling into the errors which are so common, but which are more excusable in other parts of the Exhibition.

SANITARY HOUSE CONSTRUCTION, DAMP-PROOF AND FIRE-PROOF BUILDING MATERIALS, &c.

FOR the remainder of our notes of the exhibits in Class XXVIII., we will deal first with those relating to damp-proof and fire-proof construction and materials irrespective of the numbering of the stands, as those exhibits are more germane to the subjects of our heading. The Boulinikon Felt Company, of Paternoster-square, E.C., and Manchester (Stand 822), show a large assortment of felts for various uses, including woollen underfelt, paper carpet underfelt, cotton backed untearable felt, and a waterproof felt. The untearable material is stated to be damp-proof, and it can be taken up and relaid several times. The waterproof or "Lotus" material is put forward as a speciality for laying on stone and damp floors, and also for roofing and damp courses. The patent stair-pads will certainly be found serviceable for making the treads noiseless, and saving the carpeting from too rapid wear. *En passant*, we may observe that felt of most kinds has recently been much improved in its manufacture, and as applied to roofing and damp-courses, when well manufactured it is proving a very valuable material within certain limits of duration. Messrs. Engert & Rolfe, Barchester-street, E.C. (Stand 823) display a number of exhibits kindred to the foregoing, including asphalte and felt for roofing and lining roofs; inodorous bitumen felt for roofs, damp walls, and iron houses; hair felt for roof lining, protecting water-pipes from frost, deadening sound; and fibrous asphalte anti-damp course. These goods appear to be of excellent manufacture, and we have little doubt from an experience of the use of felt that a portion of those put forward will fully answer expectations. Messrs. Frederick Jones & Co., Perren-street, N.W. (Stand 827), present specimens of a rather newly introduced material entitled "Silicate Cotton." This substance is a mineral fibre manufactured from blast furnace slag, and it is otherwise named "slag wool." There are models on view showing its application for fire-proofing and sound-proofing, and for preventing the transmission of heat or cold. Our experience of this new material is too short to enable us to say to what extent it is fire-proof, sound-proof, heat-proof, and vermin-proof. The material is put forward as applicable to ceilings and floorings with either wooden joists or iron girders, and also for covering steam boilers and pipes, hot and cold water pipes, cisterns, refrigerator chambers, &c. If silicate cotton is successful even in a tithe of these cases of application, it must prove highly serviceable. Messrs. Clark, Bunnett, & Co., Rathbone-place, Oxford-street (Stand 824), have some very valuable exhibits in respect to fire-proof construction, accompanied by drawings and sections of buildings in London where they have carried out work on their system. We have spoken more than once on former occasions of the merits of the fire-proof construction as carried out by the exhibitors. There is on view in the present instance parts of a solid floor on the floor-board surface, and again a combination of concrete and wood. The plank flooring and its fixing, the interior body of concrete, the girder work in all parts, in disposition and arrangement are exceedingly well and practically carried out. The underneath finishing of the fire-proof flooring is in selenitic plaster. Sections are given of the "Ligno" concrete floors 6 in., 7½ in., and 8 in. thick. Accepting, as we said at the outset, "fire-proof" as a relative term, Messrs. Clark, Bunnet, & Co.'s construction may be counted upon as one of a reliable character. Mr. William White, Abergavenny (Stand 830), exhibits his very favourably-received and largely used "Hygeian Rock Building Composition" specimens of walling and water-tanks constructed with its aid, impervious wall-lining, and an improved method of building walls to render them damp-proof, and to increase their strength. A portion of a brick wall *in situ* is shown, in which the courses are treated with this composition; and as a test of its strength a weight is suspended of such a trying character as might be reasonably supposed to crack or tear the brickwork asunder. But it remains stable under the

severe test. The advantages in using this composition are that by its aid walls one brick thick can be substituted for walls two bricks thick, the former being as strong, if not stronger, than two-brick walls constructed in the ordinary way. The composition is also applicable in the construction of reservoirs and tanks, swimming-baths, gas-holders, sea-walls, dock-walls, and silos for ensilage. The composition may be safely pronounced a good damp-proof material, and in every way worthy of extended use. On the score of cost, too, there will be a saving in the use of this composition.

The Patent Durable-Roofing Felt Company, Stamford-street, Blackfriars (Stand 834), display an assortment of their durable roofing felt for covering roofs, for preventing damp in walls, for resisting fire, and a sanitary disinfectant. These exhibits do not materially differ in manufacture from some felts already noticed, but we may say that those on view are apparently of a good description. The Reed Lathing Company, Great Tower-street, E.C. (Stand 833), present a webbing of reed in substitution of laths as a basis for plaster work. Partitions and ceilings formed of the material are shown in different stages of preparation. The advantages claimed for this system of plastering are durability, material economy, rapid fixing and deadening of sound, and freedom from cracks. The plaster work, as far as we examined it, looks fair enough, but we see no novelty in the use of the reeds, which have been used in different parts of England for several centuries as a basis for plaster work. Under a strong fire we fear this plaster construction (when subjected to the action of water in fire extinction, and the chemical changes developed under such conditions) would rapidly succumb. But the use of reeds in ordinary cases may prove economical. Messrs. Francis & Co., Vauxhall, S.E. (Stand 831), show excellent specimens of their Portland and Parian cements and plaster-of-Paris, together with a testing machine. A block of Portland cement, section 1¼ in., is shown between the jaws of the machine, tested to 1,500 lb. A small model of a house, with concrete walls, finished off with Portland cement, is on view. This cement can be used for bases, mouldings, columns, slabs, &c. There are also presented specimens of cement concrete, made of 12 ballast to 1 cement; 9 ballast to ditto, and 6 ballast to ditto. All the exhibits are excellent, and of a satisfactory kind. Mr. William H. Bateman, Cannon-street, E.C. (Stand 828), has on view specimens of wood prepared by Sir William Burnett's process, also canvas and fire hose subjected to the same process, with specimens of Sir William's improved system of wood-brick flooring. A model of an apparatus used in this process for preserving timber is also on view. There are so many processes before the public for preserving timber by the application of chemical agents, and for preventing the ravages of dry rot and wood-boring insects, that it is impossible to say which is the best method. Circumstances must govern the application of a number of processes, for what is suitable under some conditions of the employment of timber will not be found to answer under other conditions.

Among the few other remaining exhibits in Class XXVII., some have already been incidentally noticed in articles on Sanitary House Decoration, and the remainder are in course of notices under other classes of exhibits. It may be said here, however, that the exhibits of Phillip's Patent Lock-Jaw Tile Company (Stand 837), the Bracknell Pottery, Brick, and Tile Company (Stand 838), the Wortley Fire Clay Company (Stand 842), Messrs. W. Ingham & Sons, Bucklersbury, E.C. (Stand 840), and a couple of new exhibitors of similar wares, that their goods in roofing tiles, bricks, and terra cotta objects are up to the usual standards. Besides glazed stoneware for various purposes, the last-named firm exhibits some good vitrified red bricks for sewers, capable of resisting the destructive action of sewer gases.

We have now exhausted all the exhibits calling for notice in Class XXVIII., and it may be seen that they are for the most part of an important character. In those relating to damp and fire-proof construction some advance has been made, but much yet remains to be accomplished in these departments of the building art before exhibitors, builders, or the general public can feel satisfied that the limits of healthy and secure construction have been reached.

INDIA.

The Indian exhibits, which occupy a space at the west end of the Central Gallery, are, as might be expected, principally of a decorative and artistic description, the sanitary and healthful aspect being but indirectly represented by means of condiments, tea, tobacco, &c.; but this is illustrated in a commensurate manner, and gives a good idea of the importance of this branch of the general supply, and in one instance the two classes are shown by one exhibitor, viz., Mr. Wm. Bowden, 15c, Hogarth-road, Kensington, who draws attention to a method, which seems useful, of packing tea in small quantities in tinfoil packets. The tinfoil, which is of a soft and pliable nature, is sealed by applying a hot iron where the edges overlap, the use of solder being done away with, and, as it has been shown that muriate of zinc occurs in ordinary soldering, and is an active poison, one apprehension is removed. A novelty is also shown in some Zanzibar mats of a large size, made from palm fibre of a diagonal texture close-woven by hand: the colouring is good, being both sides alike, and the stripes running transversely to the length of the mat. Some smaller mats of Cingalese fibre are of finer texture, light colour, and good quality, and very little known here. Another comparative novelty is a Cingalese reed curtain, which consists of short lengths of a species of bamboo strung together longitudinally by a fine cord, each length being separated by a glass bead, which gives a free movement and prevents chafing; the pattern is formed by having the pieces of bamboo of a different colour, so that horizontal lines, or diamond shapes, &c., of various sizes, can be obtained; although these stripes hang vertically and allow a free passage of air, they can be looped up like an ordinary curtain, and for a hot climate must be very serviceable. Some good specimens of modern Benares ware, Mooltan pottery, and rich silk embroidery, and various hand-printed and woven hangings, are also to be seen, although there is not much space to display them to advantage. Upwards of seventy specimens of wheat are on view from the different provinces of India, showing a great difference of size and shape of the grain, and it is also the intention of Mr. Bowden to show specimens of rice, which, by the way, appears to have been overlooked by all the exhibitors, and this is greatly to be wondered at, considering the important part this cereal takes in the products of so vast an area.

A very large space is allotted to Messrs. Vincent, Robinson, & Co., who fill the floor space, walls, and even the roof, with good and in some cases unusually large carpets and rugs of good quality and exceptional range of colour, and in addition to these are a few old specimens of brasswork, which are somewhat rare.

Some specimens indigo are shown by Messrs. Lehzen & Co., who bring examples, and give values, of the different kinds from Java, India, and Guatemala, but in this, as in other instance in this section, it would be of greater interest if further description were attached.

Mr. Alfred Iuman, 17, Ebury-street, Pimlico, has a few specimens of Tussore (or Tusser) and corah silks: it is from this latter that the French make their "foulard," which is so popular among the feminine community. Also are to be seen a few specimens of modern Indian pottery, in which a European tendency of colour and form becomes visible; but a few plates are exempt from this, and one or two in particular partake more of the Rhodian character. A few curiosities are also added, amongst which are some silver Swami cigar mouth-pieces (the Swami is one of their gods which figures on every convenient and inconvenient space), brass spice-boxes with the inevitable peacock, and sundry curios of a like description.

The Indian Tea Districts Association give a large diagram of Ansell's patent tea-sorter, which is an ingenious machine for winnowing and separating the various qualities of teas, capable of dressing 500 lb. per hour. Near this is Davidson's tea-drying apparatus (the "Sirocco"), but this is apparently so self-contained that no action is visible, and to all intents and purposes might be a large stove; here, again, some description might be appended to lead visitors to take an interest in a process which at present passes unnoticed. Tobacco is represented by some very good-looking specimens of cigars and Manilla cheroots, sent by John Mark, of St. Anne's-square, Manchester, and M. R. Jurando & Co., but whether these, in a "Health" point of view, are exhibited as incitements or as warnings, we will not undertake to say.

The "Empress of India" is well worked in wool and floss silk, in a way which redeems the ordinary weakness of work in this material, some portions being very well managed; and as it has taken gold medals at Calcutta, Melbourne, Sydney, and Adelaide, it has presumably found favour. Mr. Warde, who shows this, has also some ordinary modern sandal and other wood fairings requiring no comment.

Mr. T. Wardle, of Leek, Staffordshire, shows some silk skeins of good quality, and in this case are some pieces of silk printed and woven with Indian material and dyes; these "tusser" cloths (from the Hindu "tusuru," or shuttle) are evidently from the South Kensington Museum, although not stated as such. They are, of course, selected specimens, and very delicate in pattern and colour.

The Upper Assam Tea Company show many varieties of tea, and call attention to the rapid advance in favour of the products of this and the neighbouring districts. It appears that within the past fifty years upwards of a quarter of a million acres of jungle have been cleared by our countrymen and planted with tea, employing over a quarter of a million people in the cultivation. Some small tea-plants are shown, varying somewhat in character,—one looking like a small laurel, more especially as it has a white edge like the variegated description so general; another has a serrated edge, and would be scarcely distinguishable from many of our indigenous plants. As an example of the importance which this industry has assumed, it is stated that the consumption of tea in 1883 in the United Kingdom was 170 million pounds, of which over one-third was Indian. Some of the seeds are shown, which are of the same size, shape, and colour of small chocolate drops.

One of the most interesting collections has been brought together by Messrs. Procter & Co., 428, Oxford-street, who have erected a special pavilion in keeping with their exhibits, which are of a comprehensive character, including textiles, pottery, jewellery, woodwork, musical instruments, &c., some of which are of considerable rarity. The native cleverness in their particular branch of metal work is shown in their plates and vessels and in strange juxtaposition of metals, such as silver hammered into iron and zinc, and gold into steel, in their weapons. Among the fabrics are some embroidered purdahs or cotton cloths, and printed sarees of rich and strong dead colours, which make very satisfactory decorative hangings, and Benares kincobs of gold embroidery on silk, Decca and brocaded muslins from Jaipur, all of which attract attention, which seems to be divided between these and a somewhat extensive selection of native jewellery and precious stones, some of which are uncut and unmounted, and show great variety in disposition. The pieces of blackwood furniture from Bombay and Ahmedabad are good specimens, and show a more florid treatment than many similar objects, the inevitable gods being omitted, and giving place to foliage and flowers. Those who take the trouble to carefully examine this section of the Exhibition, and ask a few questions of the attendants, will find much more to interest them than is apparent at first sight, as the various objects are so spaced that they are not always fully extended or easily got at.

SANITARY FITTINGS.

To conclude our notice of the exhibits in the Eastern Annexe.

Stand 542 is occupied by Messrs. George Farmiloe & Sons, of St. John-street, Smithfield, who exhibit the "Eos" water-closet, which is made in one piece of earthenware, and is, as we have pointed out on a previous occasion, a very simple and effective appliance. Messrs. Farmiloe & Sons also show their water-waste preventing cistern, for which it is claimed that it gives a full flush and after-flush without the aid of a syphon, and that it is suitable for either valve or hopper closets. The Du Bois American drawn-lead traps and bends for soil-pipes, sink and bath wastes, &c., are shown in a variety of forms at this stand, and the exhibitors also show samples of lead pipe made by them at the Island Leadmills, Limehouse, together with a good assortment of plumbers' brasswork.

Mr. John Parker, of Woodstock (Stand 544), shows his dry-earth and ash-closets, which exhibits some improvements. A urine separator

is now fitted to out-door closets; this carries the liquid away to a drain or pit, leaving the solid matter dry. This closet is fitted with seat-action, so arranged as to provide for the admission of the requisite supply of ashes to the receptacle each time the closet is used.

Stand 545 is occupied by Messrs. Lawson & Donkin, architects, Bournemouth, who exhibit what they claim to be "the only combination earth and water-closet." At the time of our visit, however, it was evidently out of order, or had not been properly fixed, and as the stand was without an attendant, or any written or printed description of the apparatus, we are not prepared to express any opinion upon the merits of the contrivance, which apparently provides for the separation of the liquids.

Messrs. G. T. Blundell & Co. (Stand No. 547), show their improved double-valve water-closet, which is suitable for use either in buildings or on board ship. It is claimed that the shape of the pan (of hopper form) is such as to prevent any lodgment of matter after the handle actuating the top valve has been raised. The after-flush is effected without any special apparatus, but the supply-pipe is of large diameter and carried entirely round the top of the pan, and the water retained in the pipe after the valve is closed is stated to be sufficient to seal the top valve. In addition to the top valve there is a second one below, which is always closed before the top one is opened, so that any direct communication between the soil-pipe and the closet is cut off. The axles of the valves work through stuffing-boxes. The motions of the upper, lower, and water-supply valves are effected by one lever. Provision can be made for running a ventilating pipe into the space between the two valves.

On Stand 548 is a half-sized working model of Mr. J. Conyers Morrell's patent self-acting cinder-sifting ash-closet, exhibited by the Sanitary Appliance Company, of Manchester. The closet makes use of household ashes for sanitary purposes by separating the dust from the cinders, a quantity of ash-dust being delivered over the soil on each use of the closet; the sifted cinders fall at the rear.

Mr. H. C. Symons (Stand 555), of George-street, Blackfriars-road, shows two or three applications of a patent taken out by him (No. 651 of 1883) for raising, lowering, and holding weights. He applies this invention to a water-waste preventing cistern and to the ordinary cottage-valve or other water-closet apparatus. An essential part of the invention consists of a belt or cord with a motor or operating weight attached to one end and an adjusting weight on the other end, the belt or cord being coiled on a stud or axle and the descent of the motor-weight retarded, partly by friction and partly by the adjusting weight. The motor-weight can thus be lowered automatically and timed in its descent by the combined action of the belt and adjusting weight. Various other arrangements are possible, but from what we have said it will be seen that the invention is applicable to a variety of purposes, the automatic closing of valves connected with water-closet flushing apparatus being among the number. The patentee's brake-closing valve cistern deserves the attention of visitors, as also does his apparatus for connexion with water-closet valves. The invention is applicable to any form of valve-closet, but the exhibitor stands somewhat in his own light by exhibiting it attached to one of the now generally and deservedly condemned pan-closets,—condemned, we may say for the information of non-technical readers, because the huge iron "container" into which the basin fits and into which the "pan" empties, is a retainer of filth. Nevertheless the invention seems to be well worth attention on its own merits; but, unfortunately, the stand allotted to the exhibitor is exceedingly small, and he is placed at a further disadvantage in not being able to show his appliances in action with the use of water. It is thus impossible for visitors to fully judge of the value of the invention, and we think it might be possible to assign to the exhibitor a better position, especially as several more suitable positions are even yet unoccupied.

Stand 566 is occupied by the Domestic Engineering and Sanitary Appliances Company, who have on view some very useful fittings, including the Oxford wash-out closet and rustless slop-tray.

We have now dealt with the whole of the sanitary fittings in the Eastern Annexe, but there are others scattered about in various parts of the Exhibition, notably in that portion of the East Central Gallery, where the baths, &c., are on exhibition. This portion of the Exhibition will be noticed in our next.

HEALTH EXHIBITION CONFERENCES.

(*Continued from p. 874 of the present Number.*)

The meeting held on Tuesday afternoon was under the presidency of Captain Douglas Galton, C.B., F.R.S.

The first paper read was by Dr. George Wilson, Medical Officer of Health for the Mid-Warwick District, on

DOMESTIC SANITATION IN RURAL DISTRICTS.

Dr. Wilson observed that fortunately for health requirements, he believed that the population was steadily diminishing in the strictly rural parts of the country, otherwise the question of overcrowding, in consequence of the closing of dilapidated cottages, would become much more serious than it was. But when it was considered that a large proportion of the cottages which were still considered habitable only contained one sleeping-room, it must be conceded that decency could not be maintained with a growing family, and that overcrowding was common enough. One great difficulty in dealing with this question was the fact that the wages of the agricultural labourer did not enable him to pay a rental which would be sufficient to encourage private enterprise in building new cottages, even when land could be readily leased or purchased. A comfortable cottage could not be built for less than 100*l*., and the average rent paid by agricultural labourers would not yield a higher return than three per cent. But many old cottages could be purchased at such a cheap rate that after having been put into habitable repair, they would yield a return of from ten to fifteen per cent., so that if sanitary authorities had the power to purchase and repair old cottages and build new ones in districts where the obligations of landowners were persistently neglected, he thought a vast improvement could be speedily effected without unduly increasing the rates. There ought to be an amendment of the Public Health Act to enable sanitary authorities to enforce by-laws, not only in respect to new houses, but in respect to the kind and situation of closets and the proper construction and disconnexion of drains. Next with respect to the water supply, the usefulness of the Public Health (Water) Act was limited, inasmuch as it applied only to rural districts, whereas it should be made applicable to all districts, whether urban or rural, not provided with a public water supply. The disposal of refuse included three very important items in village sanitation, viz., closet accommodation, scavenging, and drainage. The water-closet which was found to answer best in districts where there was no public water supply was the simple pan-closet, with syphon bend and ventilating shaft, and he always recommended that the slop water be used for flushing purposes. Of course, this applied only to outside closets; where the water-closet was inside the house, it should be provided with proper cisternage and other appliances. But even when the closet accommodation was of a kind to satisfy all reasonable sanitary requirements, cleanliness of the surroundings could not be maintained without due attention to scavenging. He was of opinion, however, that for the great majority of villages public scavenging was not only unnecessary, but to insist upon it was unreasonable. But there still remained the serious difficulty of satisfactorily disposing of the slops and refuse water, and in villages of any size this implied a system of drainage of some sort, which would depend in a great degree on local circumstances. But suppose a village was fairly well drained, or required to be well drained, how was the sewage or slop water to be ultimately treated? That also depended much on local circumstances, but in whatever way the slops were ultimately disposed of they required to be conveyed by one or more outlets to a safe distance. In conclusion, Dr. Wilson expressed the opinion that medical officers of health should be trained men and debarred from private practice, while surveyors and sanitary inspectors should hold certificates from the Sanitary Institute or some other examining body as to their fitness to discharge the duties required of them. Extended legal powers were also required for rural districts.

SANITARY HOUSES FOR THE WORKING CLASSES IN URBAN DISTRICTS.

Mr. H. Percy Boulnois, M. Inst. C.E., Borough Engineer of Portsmouth, read a paper on this subject. He described the requirements of a house which could be built at a very moderate cost, suitable for the habitation of the working man and his family, and within his means, and at the same time be as sanitarily perfect as modern science would admit. The site should be clear of all filth; it should not be an old refuse-tip, and if marshy it must be drained. The whole of the site of the house within its walls should be covered with a layer of cement concrete, 6 in. thick, to prevent the ground air rising into it. No basements should be allowed. The external walls of the house should be constructed hollow, by means of two 4½ in. walls, with a space of about 2½ in. between, proper damp-courses of asphalte or slate being provided. The house might contain either four or six rooms. In the former case the ground-floor would have parlour and kitchen, the upper floor two bed-rooms; in the latter the kitchen could be built as a tenement wing at the back, with a small bedroom over it. The height of the rooms should be 8 ft., the windows being sash-hung and opening at the top, and if any special means of ventilating the rooms could be introduced which would be beyond the tampering powers of the inmates, so much the better, if it did not make the rooms too cold or draughty. One favourable means of good and cheap ventilation was by a simple construction of the fireplace, the back and sides being made hollow, with air-bricks on the floor-level, the fireplace itself being merely formed by three or four iron bars built in across the front. Great care should be exercised, in laying the floors, that the battens should be close jointed. Open joints were highly unsanitary. The walls of the rooms should be painted or distempered in bright, cheerful colours. The roof of the house should be flat, covered with cement concrete and a thin coating of genuine mastic asphalte. This flat roof could be approached from the top landing by a flight of easy steps or stairs. Not only did such a roof give a more even temperature to the rooms under it, but it afforded a ready escape for the inmates in case of fire. It was cheaper of construction than an ordinary slated or tiled roof, and it served as a pleasant place for recreation or even as a garden or drying ground. At the back of the house there should be a court-yard paved with asphalte, not the usual nondescript inclosure called a "garden." Plenty of air-space should be provided in front of the house. Upon the back yard should open the doors of the wash-house, the water-closet, &c. No fixed dustbin should be allowed: fixed dustbins, except for large establishments, were a dangerous nuisance, as they were difficult to empty and clean. The water supply for flushing must be ample, and come from a sufficient height, and through a 1¼-in. pipe at least. The main sewer should, if possible, be at the back of the house for two important reasons; first, because the drain need not then pass under the house; and secondly, that of economy, as less length of drain was required. If it were unavoidable that the drain should pass under the house, then it must be completely surrounded by good cement concrete. The sink in the scullery or kitchen should be one of the many glazed stoneware patterns to be seen in the Exhibition, not of stone or cement; and the pipe leading from it should empty into a pit covered with a grating and provided with a syphon, or, still better, to a simple form of grease-trap, which could be purchased for a few shillings. The rain-water down-pipes must also empty themselves on to or near open gratings, and must on no account be connected directly with the drain. The water supply should be constant, but if it were unfortunately intermittent then the cistern must be placed in such a position as to be easily seen and cleansed. The above requirements for a sanitary house were perfectly simple and not prohibitive of the strictest economy. A change was, however, required in the present machinery and manner of the inspection of dwellings in course of erection, and until a larger staff of inspectors or sanitary police were employed little real advancement would be made in the sanitation of buildings.

In the course of the discussion which followed, Professor Sir Henry Acland, K.C.B., M.D., after expressing his sense of the value of the papers which had been read, said he quite agreed with an opinion expressed by Dr. Wilson as to the

desirability of instruction being given in Sanitary matters in our Board Schools. It was not by State compulsion that people were to be kept clean, but by the influence of knowledge on personal character.

Sir Robert Rawlinson agreed with Sir Henry Acland that sanitary improvements must be a matter of education and not of State compulsion, and said he must appeal to the ladies, for this was a question on which female knowledge must come to the front. As regarded extravagance, he had sanitary plans and estimates come before him every day of his life. He had to look them over, and he found that, instead of sanitary works being carried out with greater economy or cheapness than formerly, he was staggered at the extravagance shown; he was appalled at the estimated sums for drainage. These Local Boards were independent in a measure in their action. After the central Board had sanctioned a scheme the Local Board had perfect control, and the gentlemen elected to look after the interests of the ratepayers were often either ignorant of their duties or they were careless. The works were left to the contractor; the local surveyor did not attend to his duties, and over and over again the estimates were exceeded one-third, one-half, and sometimes doubled.

Dr. Thursfield (Shropshire) observed that good water was often to be obtained by sinking wells, but frequently no trouble was taken in finding the best sites; easy access was the only thing considered.

Dr. Woodford (Berkshire) spoke of the importance of imparting sanitary instruction to the poorer classes.

Dr. Carpenter remarked that it was perfectly useless to have by-laws for sanitary regulations unless the people could be made to understand the objects for which those regulations were carried out.

Sir Thos. Acland, M.P., said if he had learned anything it was that great progress had been made in the minds of those who were sanitary workers, and that they were looking now to what was the fundamental work to be done, viz., educating the people. He wanted, however, to see a statutory enactment that all officers of health and inspectors of nuisances should have an educational qualification.

Dr. Sanders (Herts) thought the time had come when an amendment of the Public Health Act should be obtained.

Dr. P. Nunn (Bournemouth) was of opinion that one of the practical points to be considered by that Conference was as to whether power could not be obtained to buy land compulsorily on which to erect labourers' cottages.

Dr. Dudfield observed that there were forty medical officers of health in London, and he thought that was sufficient. These officers should be paid adequate salaries to enable them to dispense with private practice. He wished there was power to compel sanitary authorities to do their duty.

The Chairman, in some concluding observations, said he did not see any reason why living in flats should be unhealthy. Much as he had advocated fire-places for purposes of ventilation, he thought some arrangement might be advantageously made by which fire-places could be got rid of in large blocks like the Peabody buildings. He thought that if sanitary officers would exercise the powers they possessed in an intelligent manner there would be very few insanitary houses in England.

At the meeting of the Conference held on Wednesday last, Dr. Bristowe read a paper on "Industrial Diseases." A report of this is deferred.

INTERNATIONAL CONFERENCE ON EDUCATION.

The Executive Council of the International Health Exhibition have determined to hold an International Conference on Education in connexion with the Education Division of the Exhibition: they have appointed a committee of management, who have drawn up the following programme. For convenience of discussion, all papers to be read will be printed beforehand, and they will subsequently be published by the Executive Council.

Persons desirous of attending the Conference are invited to send in their names to Mr. R. Cowper, secretary to the committee of management, International Health Exhibition, South Kensington, to whom any inquiries can be addressed.

The following is the order of subjects to be treated:—

1. *Conditions of Healthy Education.*—Under this head may be included the consideration of the structure, fitting, and equipments of a school; gymnastics and other physical exercises; the right apportionment of time to different subjects of instruction in schools of various classes; the indirect effect of pictorial or other decoration in improving the taste and cultivating the imagination, and in increasing the scholars' interest in their work.

2. *Infant Training and Teaching.*—(*a*) Kindergarten; (*b*) Instruction generally. Under this head may be included the right structure of schools and class-rooms for very young children; the apparatus needed for play and for instruction; the exercises, mental or manual, best fitted to awaken the faculties; the distribution of time; pictures, decoration, collections of objects, &c.

3. *Technical Teaching.*—(*a*) Science; (*b*) Art; (*c*) Handicrafts; (*d*) Agriculture; (*e*) Domestic Economy. Under this head may be included:—(*a*) methods of teaching the different branches of physical and of natural science, the equipment of school laboratories, the value of experimental work by pupils, the organisation of evening science classes and of science schools, the connexion between the teaching of pure and applied science; (*b*) the teaching of drawing and of colouring as a preparation for designing and decorative work; (*c*) the value of special and general workshop instruction in elementary, higher, and evening schools, the equipment of school workshops; (*d*) the teaching of agricultural science in elementary, in intermediate, and higher schools, in evening science classes, in special colleges, and in the universities, methods of teaching experimental farms; (*e*) methods of teaching cookery in schools, *e.g.*, by book lessons, by demonstrative lectures, and in school kitchens.

4. *Teaching of Music in Schools.*

5. *Museums, Libraries, and other Subsidiary Aids to Instruction in connexion with Schools.* — Under this head may be included the means of establishing and managing school libraries; the promotion, with the help of the scholars or otherwise, of museums of art and science, illustrative of the local fauna, flora, industry, history, archæology, &c.; school savings' banks; botanical and other field excursions; visits to picture-galleries and museums; voluntary evening classes for singing, recitations, &c.; and generally the means of connecting the influence of the school with home life and self-improvement.

6. *Training of Teachers.*—Under this head will be considered the right professional preparation for teachers in (*a*) Elementary; (*b*) Intermediate and Higher; (*c*) Special and Technical Schools. The relative advantages of training in special institutions and in colleges for general education. Normal colleges, their constitution, conditions of admission, programme of studies; apprenticeship; model and practising schools; universities and their relations to the training of teachers; professorships and lectureships on education; examination for diplomas and certificates; legal recognition of such diplomas and certificates; registration of teachers.

7. *Inspection and Examination of Schools.*—(*a*) By the State; (*b*) By the Universities; (*c*) By other Public Bodies.

8. *Organisation of Elementary Education.*

9. *Organisation of Intermediate and Higher Education.*

10. *Organisation of University Education.*

11. *Systems of Public Instruction in Various Countries.*

THE HOUSING OF THE POOR.

Sir,—In your impression of the 17th May [Supplement, p. 735], you refer to my drawings and the omission I have made in not stating the cost per room, although giving other figures in detail. The estimate of 2,250*l.* per block was calculated at 42*l.* per room, being the cost at which I erected a similar three-story building by contract at Bethnal-green twelve months since.

The note on the drawings, and to which you also refer, viz., "That buildings of three or four stories can be built more economically than lofty structures," I admit is a bold assertion to make, but one that can be maintained by figures. The average cost per room in lofty structures, such as the Improved Industrial Dwellings Company, is 50*l.* This extra cost is incurred by the increased thickness of the brickwork to all walls. The required thickness for a three-story building is 14 in. to the lower story and 9 in. above, whereas one of six stories requires 18 in. at the base and 14 in. to all the floors above, with a proportional increase to divisional and other walls. This gives an increase of one-third upon the large item of brickwork alone, in addition to which there is the extra cost of window linings and other matters which would not be required in 9 in. work; also a loss of floor-space, and as it is necessary that these buildings should be erected at the smallest possible cost to allow the rooms to be let at low rentals, attention to detail of this description is of the utmost importance. Taking my return of 5½ per cent. upon the outlay for a three-story building, had the height been increased to six stories the cost and return would be as fol'ows:—

Cost.—108 rooms at 50*l.*		£5,400
Land same as for three-story building...	£375	
Extra land required upon increased height to admit of equal amount of light and air, 70 ft. by 10 ft., at 3s. 3d. per foot	113	
		988
		£6,388
Return.—108 rooms at 2s. per week	10 16 0	
Rent from workshop	0 5 0	
	11 1 0	
	52	
Per annum	574 12 0	
Outgoing.—As stated on my drawing at 117*l.* 10s., but which in this case would be doubled	235 0 0	
	£339 12 0	

or 5½ per cent. only, or a loss of ½ per cent. upon that of a three-story building. Another fact in favour of my assertion is the case of ordinary small dwelling-houses. A row of six-roomed cottages can be well built at 225*l.* each; but had these six rooms formed part of a lofty building, they would have cost 300*l.*

The object of my drawings is to show the possibility of erecting dwellings for the poor which can be profitably let at small rentals, without (to my mind) the very objectionable piling up of floor upon floor with the consequent inconvenience of lofty staircases, and the dismal and dreary appearance of the areas or courtyards debarring the sun from any chance of ever shining into the lower windows, the necessity of which has been so often pointed out by doctors and others. A room with plenty of daylight is more likely to be kept clean and free from dirt and filth than a dark one.

Another point which I claim in my drawings is the isolation of each block, which gives the sanitary authorities free control of all open spaces, and admits the periodical removal of the contents of the dust receptacle, without passing through the building, and also allows a free circulation of air to every part.

Much more might be said upon this very important subject, but I fear I have already trespassed upon your valuable space.

Joseph Wall, A.R.I.B.A.

In the article on "Dress," by "a Medical Man," in our last week's Supplement, some complimentary remarks were made as to some boots made on anatomical principles, and which were exhibited in comparison with ordinary boots, and with a model of the foot. By an oversight of our contributor, the name of the author of this meritorious exhibit, Mr. F. Lanagan, was omitted: and as other names were given, we supply his now.

HEALTH EXHIBITION.

MR. RICHARD ANDERSON, F.C.S. author of "Lightning Conductors: their History, Nature, and Mode of Application," makes a Speciality of Testing the Efficient Action of Lightning Conductors; and of giving Advice as to the best mode of applying the Apparatus for the Protection of Public and Private Buildings.—Leadenhall House, 101, Leadenhall-street, E.C.

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